

# SHIFT FROM RESEARCH AND DEVELOPMENT TO MARKETING, A CHALLENGE FOR PHARMACEUTICAL COMPANIES

## A KUTATÁS-FEJLESZTÉSTŐL A MARKETINGIG – KIHÍVÁSOK A GYÓGYSZERGYÁRTÁSBAN

**DINARA ALIYEVA** PhD-student Faculty of Economic Science  
Kaposvar University, Hungary

### Abstract

This article aims to analyse the spending trends of global pharmaceutical companies for Marketing, Sales and for Research and Development. Evaluating the spending structure of pharmaceutical companies, one has to realise that they are spending more and more on Marketing and Sales than for Research and Development. We are analysing the regulation differences among countries with a special attention to Hungary and Kazakhstan. In Hungary the pharmaceutical market is well developed. The spending structure is changing slowly, the local company is still focusing more on Research and Development than on promotion and advertising. The pharmaceutical businesses of Kazakhstan are still in infancy but from the very beginning the marketing expenditure overwhelms the Research and Development expenses.

**Keywords:** Research and Development, new drugs, original drugs, generic drugs, marketing, sales, advertising, promotion of drugs, pharmaceutical industry, pharmaceutical market.

### 1. Introduction

The article analyses the expenditure on Research and Development by the industry sectors for the period 2005-2015. Also we consider the spending of the top 10 major companies in the world focused on Research and Development for ten years. In this paper we analyse the Marketing and sales expenditures of the global pharmaceutical companies for the period for 2000-2015 years. The accurate statistics are often missing so we have to estimate the expenditure on Marketing and Sales as well as on Research and Development.

There are the appropriate analysis only of the Hungarian and Kazakhstan pharmaceutical industries. Of course, we have also looked at some of the most important players in the world's pharmaceutical industry as well.

Also we cannot generalise the results, which are based on two companies, one representing Hungary, this is Richter Gedeon, which is still an independent Hungarian company and still has original drugs, where the patent is their own, and the other one is a Kazakhstan pharmaceutical company Chempharm, which focuses on the production of generic drugs. Also this is bias from the stand point of the comparison but we cannot find a pharmaceutical company in Kazakhstan which has its original drugs for sale. Beside the market statistics, we are considering the regulation differences among the countries with special attention to Hungary and Kazakhstan.

Currently pharmaceutical companies are spending proportionally less on Research and Development year by year. The development of new drugs is a costly and time consuming process. The research activity of creating new drugs requires millions of dollars and the licensing process may take some decades. The shortest time frame is at least 10-15 years.

«Big Pharma says this occurs because of the astronomical costs of developing a new drug. The truth is that United States law allows drug companies to set the prices for drugs and protects them from free-market competition. Other countries set a limit on what companies can charge based on the benefit of the drug. The true cost of developing a drug is shrouded in mystery with many unverifiable figures reported by Big Pharma. Advertising instead of research: For each dollar spent on «Basic research» Big Pharma spends \$19 on promotions and advertising in medical journals, internet, television, radio and in other instruments to attract the attention of consumers» (Llamas M, 2016).

«There are some challenges and «threats» within the industry. The first question is the sustainability of growth, but not less important the ever-increasing cost to bring new drugs to the market and the profitability loss because of the increasing marketing and Research and Development costs. The prices of the drugs vary in Europe and in different regions of the World. The uptake of new drugs to the market is slowing down and the patent expiration issues are harder than used to be in the past» (Rod M., 2007).

## **2. Literature review**

Literature mainly deals with the question of the research intensity of the pharmaceutical industry. Researchers generally agree that the pharmaceutical industry is one of the most knowledge demanding industries. Austin made a good comparison with other industries to show the research intensity of the pharmaceutical sector: «The pharmaceutical industry is one of the most industries dependent on intensive research in the United States. According to the Congressional Budget Office «The pharmaceutical companies invest as much as five times more in Research and Development relative to their sales than the average United States manufacturing company. In the United States common rate of Research and Development for a pharmaceutical company is about 17% of it is sales that is far higher than other industries» (Austin D, 2006).

There is also a consensus among scholars that the profitability of companies is largely determined by research and marketing costs. Evans and Drummond and others summarize it well in their papers:

«In pharmaceutical industry Research and Development plays a key role on developing of new drugs, which has a tremendous effect on companies' profitability according to patent. On the other hand, drug and health service constitute a large volume of advertising in the world. It is reason is that there is asymmetric information between the customer and seller» (Evans R, 1995). «Two factors affecting companies' profitability are costs related: one is Research and Development and the other is marketing cost» (Drummond M, 1992).

«Although the pharmaceutical industry emphasizes how much money it devotes to discovering new drugs, little of that money actually goes into basic research. Data from companies, the United States National Science Foundation, and government reports indicate that companies have been spending only 1.3% of revenues on basic research to discover new molecules, net of taxpayer subsidies» (Lexchin, 2005).

The authors generally agree that marketing costs are growing rapidly in the industry: «Marketing budgets in the pharmaceutical industry are huge by comparison to most other industries, but they are often predominantly spent on the marketing channel, delivering the

product to the customer. These characteristics seem to indicate that the simple linear model of innovation still captures the overall approach to innovation in the pharmaceutical industry» (Trott P., 2002).

In contrast the authors disagree on the causes of the rapid increase in marketing costs. Most authors (Stremersch) argue that this is the «speciality» of this industry and stresses the difficulties of delivering information on medicines to consumers. Stremersch speaks about «specialized marketing knowledge»: «The pharmaceutical industry spends a notably large percentage of its revenues on marketing. United States pharmaceutical companies spend on average more on marketing, compared to their average Research and Development expenditure. The pharmaceutical industry requires specialized marketing knowledge. The market faces unique challenges in facets such as new product development, life cycle management and marketing management» (Stremersch S, 2008).

Some other authors like Manchanda P. focus more on the «unic challenges» of the industry: «Pharmaceutical companies are characterized by a large number of new drugs launches. For instance around 41 completely new drug molecules were launched each year on average (IMS Health). However, the industry faces many unique challenges in developing and commercializing innovations. Most notably the industry faces high risk (on average one success from 10.000 original compounds), high cost (typically greater than \$800 million for each successful drug), a long development cycle (12 years on average) with a limited product life (effective patent protection is only 8–10 years)» (Manchanda P, 2005).

The others focus more on the personnel costs related to the doctor-visitor system: «In the pharmaceutical industry there has been a traditional triad relationship among doctors, patients and pharmacists. As medical professionals are the ones who directly treat patients for their ailments, their recommendations are highly regarded. In addition, medical doctors play an important role in decision-making process in planning pharmaceuticals that are carried in the formulary of their individual/group private practices and/or hospitals. Consequently pharmaceutical companies in general invest a handsome amount of resources in personal selling and other related marketing activities for promoting pharmaceuticals to the medical practitioners» (Liu S, 2004).

The majority of the authors (Smith, Lakdawalla, Rosenthal, Rubin) focus on the positive effect of marketing. Smith speaks about the «promotion of hope and promise». «Marketing has two main objectives: first, it should maintain present customers of it are products and services and second, it should attract new customers toward the products and services. Scientific and experimental advances of marketing in recent years resulted in it is action scope expansion and increase the success rate of this science and therefore have converted it» beyond advertisement and promotion of hope and promise» (Smith M, 2014).

The others speak about the general aim of advertisement: «to persuade consumers that the advertised product is better».

«Today the pharmaceutical world realizes that it should spend a significant amount from its investment for drug marketing in order to increase drug prescription level as well as enhance the customer satisfaction level. For instance 10 leading pharmaceutical companies in the world annually spend 34% of their sales on updating drug prescription by physicians and internal marketing» (Lakdawalla D, 2013).

«The literatures of the effect of advertising on prescribing practices have shown that such advertising increases class wide sales, helps to avert under use of medicines to treat chronic conditions and leads to some overuse of prescription drugs» (Rosenthal M, 2003).

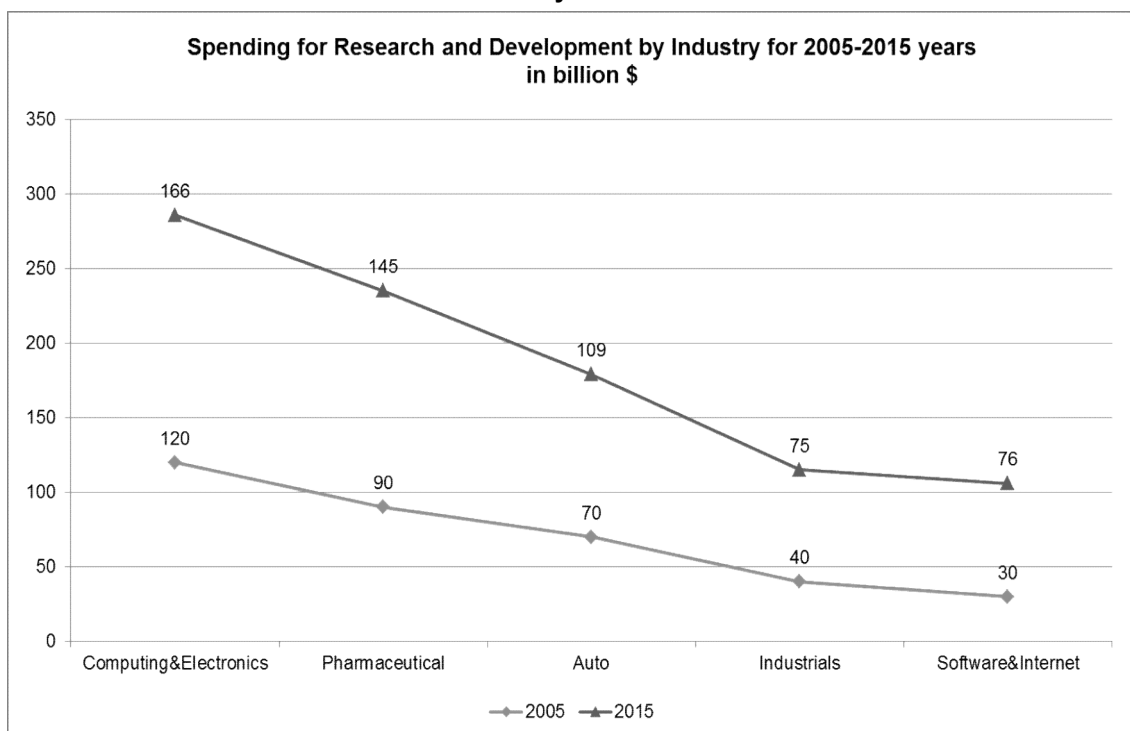
«However supporters of pharmaceutical promotions claim that marketing expenditures give innovative pharmaceutical manufacturers a fair chance to recover high Research and

Development expenditures. Moreover marketing may serve as a communication channel to educate physicians and expose consumers to information that may improve their health outcomes and medical options» (Rubin P, 2003).

### 3. The Expenditure on Research and Development by Industry for 2005-2015 years

Understanding the role of Research and Development in the pharmaceutical industry we have to compare it with other industries. We see in Figure 1 that \$120 billion was spent in 2005 on Computing and Electronics, which increased to \$166 billion in 2015. Then the Pharmaceutical industry spent \$144 billion on Research and Development in 2015, which was \$90 billion in 2005 that shows an increase. Auto industry spent in 2015 less than \$109 billion and in 2005 it was \$70 billion. In 2015 Industrials spent \$75 billion, so an increase can be seen, which was in 2005 less than \$40 billion. Also on Software and Internet \$76 billion was spent in 2015 and in 2005 it was \$30 billion. In the last ten years there are changes but the pharmaceutical industry is still the second most research concentrated industry in the world after Computing and Electronics (See Figure 1 and Table 1).

**Figure 1.: The Expenditure on Research and Development by Industry for 2005-2015 years in billion \$**



Source: Strategy & pwc 2015 Global Innovation 1000, 2005-2015

Figure 1 and Table 1 shows the expenditure on Research and Development in the Industry for 2005-2015 years.











**Table 1.: The Expenditure on Research and Development by Industry for 2005-2015 years in billion \$**

Sectors	2005 in billion \$	2015 in billion \$
Computing and Electronics	120	166
Pharmaceutical	90	145
Automotive	70	109
Industrials	40	75
Software and Internet	30	76

Source: Strategy & pwc 2015 Global Innovation 1000, 2005-2015

As we see here in Table 2 among the most Research and Development oriented companies from the top 10 five companies are pharmaceutical. In 2005 pharmaceutical company Sanofi was the first with \$9.3 billion Research and Development expenditure. In 2015 automotive company Volkswagen took the lead with a significant increase in expenditure of \$15.3 billion on Research and Development compared to 2005. Then the computing and electronic company Samsung comes with expenditure of \$14.1 billion on Research and Development, which is much more than in 2005. Software and Internet Company Microsoft spent \$11.4 billion on Research and Development (See Table 2).

**Table 2.: Top 10 companies oriented on Research and Development for 2005-2015 years in billion \$**

No	Companies	Countries	Sectors	Research and Development 2005 in billion \$	Research and Development 2015 in billion \$
1.		Germany	Automotive	4.7	15.3
2.		South Korea	Computing and electronics	4.3	14.1
3.		USA	Software& Internet	7.8	11.4
4.		Switzerland	Pharmaceutical	4.1	10.8
5.		Switzerland	Pharmaceutical	4.2	9.1
6.		USA	Pharmaceutical	7.7	8.4
7.		Germany	Automotive	7.0	7.6
8.		USA	Automotive	6.5	7.4
9.		France	Pharmaceutical	9.3	6.4
10.		UK	Pharmaceutical	5.2	5.7

Source: Strategy & pwc, The Global Innovation 1000: Top 20 Research and Development Spenders 2005-2015

Table 2 shows the Top 10 companies oriented on Research and Development for 2005-2015 years.

Pharmaceutical company Roche spent \$10.8 billion on Research and Development, which significantly increased in comparison with 2005. The next pharmaceutical company Novartis spent \$9.1 billion on Research and Development. The pharmaceutical company Pfizer is not conceded and spent \$8.4 billion. Automotive companies Daimler and General Motors spent almost the same \$7.6 billion and \$7.4 billion on Research and Development. Pharmaceutical company Sanofi spent \$6.4 billion on Research and Development less than in 2005. The pharmaceutical company GSK almost did not change its expenditure on Research and Development of \$5.7 billion compared to 2005. But these are only slight changes and the pharmaceutical industries still keep their position among the most innovative companies (See Table 2).

### ***3.1. The shift in expenditure of global pharmaceutical companies***

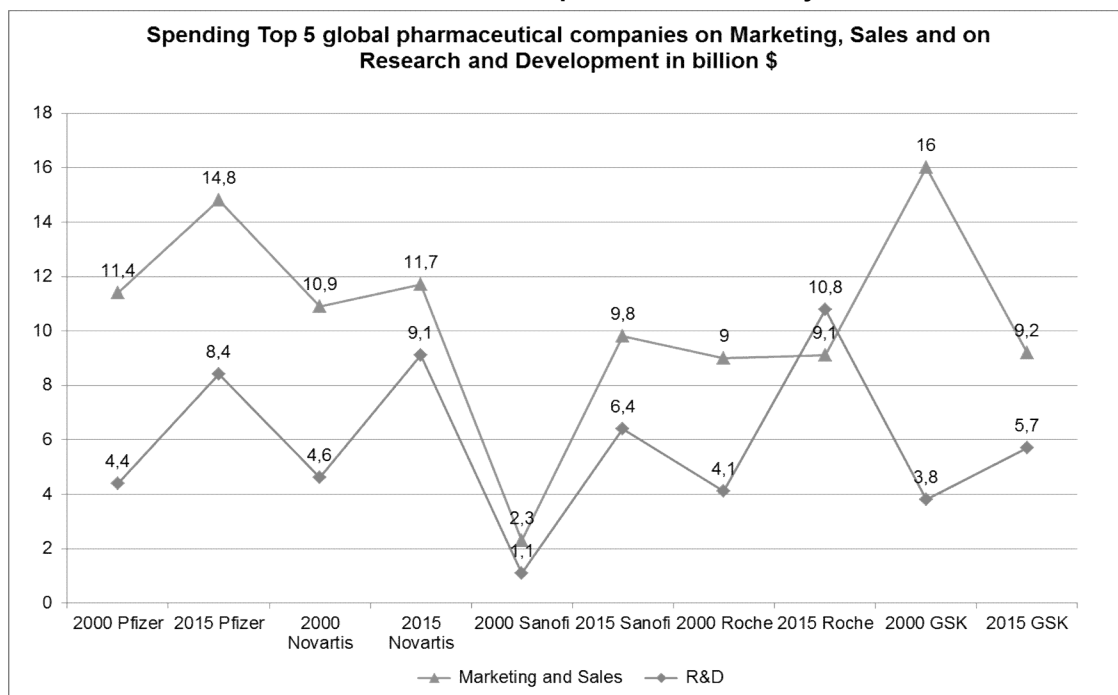
The role of Marketing, Sales and Research and Development expenditure is the most influencing one in the pharmaceutical industry. The other expenditures are stable, so we decided to study how much pharmaceutical companies spend for Marketing, sales and for Research and Development. In such circumstances, testing the relationship between Research and Development expenditure and advertising costs with the profitability of the pharmaceutical market can be interesting (Acosta A, 2014).

Figure 2 and Table 3 consider the largest share of expenditure on Marketing, sales and on Research and Development of pharmaceutical companies. The pharmaceutical company GSK in 2000 spent \$16.0 billion on marketing and sales and \$3.8 billion was spent on Research and Development. Also in 2015 GSK spent \$9.2 billion for Marketing and sales, lower than in 2000, but higher than for the Research and Development \$5.7 billion. The pharmaceutical company Pfizer in 2015 spent \$14.8 billion on Marketing and sales, rather more than for Research and Development \$8.4 billion. In 2000 on Marketing and Sales \$11.4 billion was spent and on Research and Development as little as \$4.4 billion (See Figure 2 and Table 3).

Figure 2 and Table 3 show the expenditure of the Top-5 global pharmaceutical companies on Marketing, Sales and Research and development in 2000-2015 years

The next pharmaceutical company Novartis in 2015 spent \$11.7 billion on Marketing and Sales compared to Research and Development of \$9.1 billion. In 2000 it spent \$10.9 billion on Marketing and Sales more than for Research and Development spends \$4.6 billion. The only one pharmaceutical company Roche in 2015 spent \$10.8 billion on Research and Development, almost the same on Marketing and Sales, \$9.1 billion. In 2000 Roche spent more on Marketing and Sales, \$9.0 billion, but the same as in 2015 and on Research and Development \$4.1 billion, which is comparably less. The pharmaceutical company Sanofi in 2015 spent \$9.8 billion on Marketing and sales, more than on Research and Development, which was \$6.4 billion. In 2000 Sanofi's expenditure was significantly reduced on Marketing and Sales \$2.3 billion and on Research and Development \$1.1 billion (Figure 2 and Table 3).

**Figure 2.: The Expenditure of Top 5 global pharmaceutical companies for Marketing, Sales and for Research and Development in 2000-2015 years in billion \$**



Source: Pfizer, Annual report, 2000; Pfizer, Annual report, 2015; Novartis, Annual report, 2000; Novartis, Annual report, 2015; Sanofi, Annual report, 2000; Sanofi, Annual report, 2015; Roche, Annual report, 2000; Roche, Annual report, 2015; GlaxoSmithKline, Annual report, 2000; GlaxoSmithKline, Annual report, 2015

**Table 3.: The Expenditure of the Top 5 global pharmaceutical companies on Marketing, Sales and on Research and Development in 2000-2015 years in billion \$**

Nº	Company	Marketing and Sales 2000 in billion \$	Research and Development 2000 in billion \$	Marketing and Sales 2015 in billion \$	Research and Development 2015 in billion \$
1.	Pfizer	11.4	4.4	14.8	8.4
2.	Novartis	10.9	4.6	11.7	9.1
3.	Sanofi	2.3	1.1	9.8	6.4
4.	Roche	9.0	4.1	9.1	10.8
5.	GSK	16.0	3.8	9.2	5.7

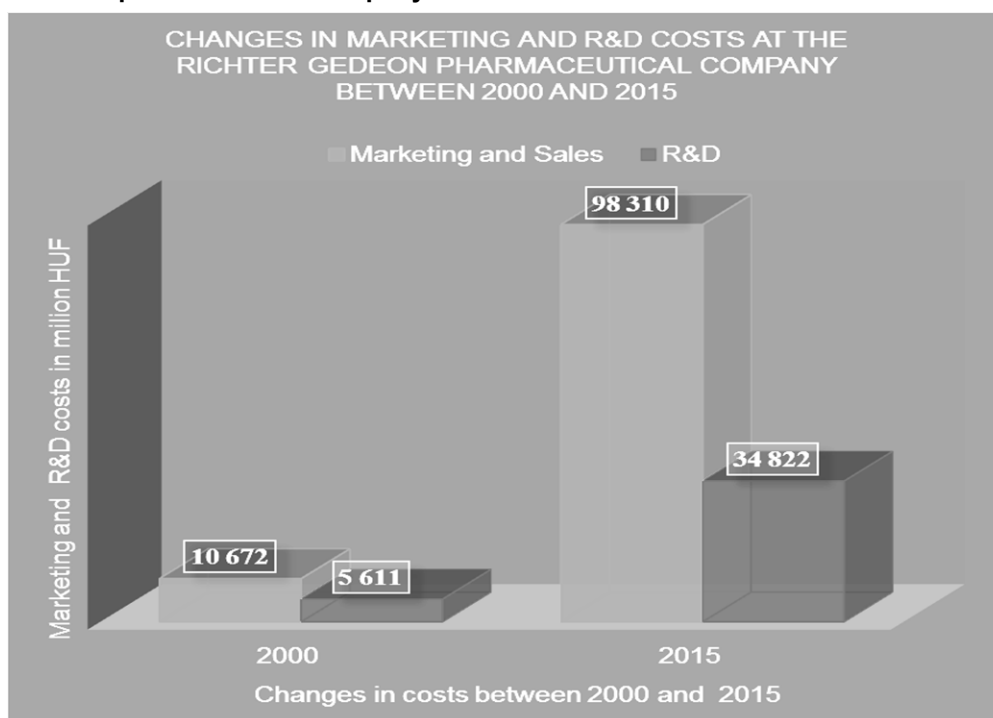
Source: Pfizer, Annual report, 2000; Pfizer, Annual report, 2015; Novartis, Annual report, 2000; Novartis, Annual report, 2015; Sanofi, Annual report, 2000; Sanofi, Annual report, 2015; Roche, Annual report, 2000; Roche, Annual report, 2015; GlaxoSmithKline, Annual report, 2000; GlaxoSmithKline, Annual report, 2015

### ***3.2. The Expenditure on Marketing, Sales and on Research and Development of pharmaceutical products in Hungary***

In the Hungarian pharmaceutical market 77% of medicines were sold in pharmacies and only 23% in hospitals in 2015. In 2015 the Hungarian pharmaceutical industry invested \$310 344 million in Research and Development. This industry employs more than 15 000 employees. In Diagram 3 we see that the most identical Hungarian pharmaceutical company Richter Gedeon spent 98 310 million HUF on Marketing and

Sales in 2015 and on Research and Development 34 822 million HUF. In 2000 Richter Gedeon 10 672 million HUF was spent on Marketing and Sales and 5 611 million HUF on Research and Development (See Diagram 3) (Richter, G, Annual Report, 2000-2015).

**Diagram 3.: Changes in Marketing and Research and Development costs at Richter Gedeon pharmaceutical company between 2000 and 2015 in million HUF**



Source: Richter, G, Annual Report, 2000-2015

Diagram 3 and Table 4 show the changes in the Marketing and Research and Development costs at Richter Gedeon pharmaceutical company between 2000 and 2015.

As you can see in Diagram 3 and in table 4, in 2015 Richter Gedeon spent on the marketing nine times, and on Research and Development six times more than in year 2000, which means the expenditure on marketing grew much faster than the expenditure on research and development which is in harmony with the world trends (See Diagram 3 and Table 4).

**Table 4.: Changes in Marketing and Research and Development costs at Richter Gedeon pharmaceutical company between 2000 and 2015 in million HUF**

Richter Gedeon company	2000 in million HUF	2015 in million HUF	Growth 2000-2015 in%
Marketing and Sales	10 672	98 310	927
Research and Development	5 611	34 822	620
Marketing/Research and Development Cost ratio	1.9	2.8	-

Source: Richter, G, Annual Report, 2000-2015

Among the independent Hungarian pharmaceutical companies Richter Gedeon is a leader in investment in research, their share in the total turnover is almost 10%, which in absolute terms puts the company in the 1st place concerning the level of expenditure on



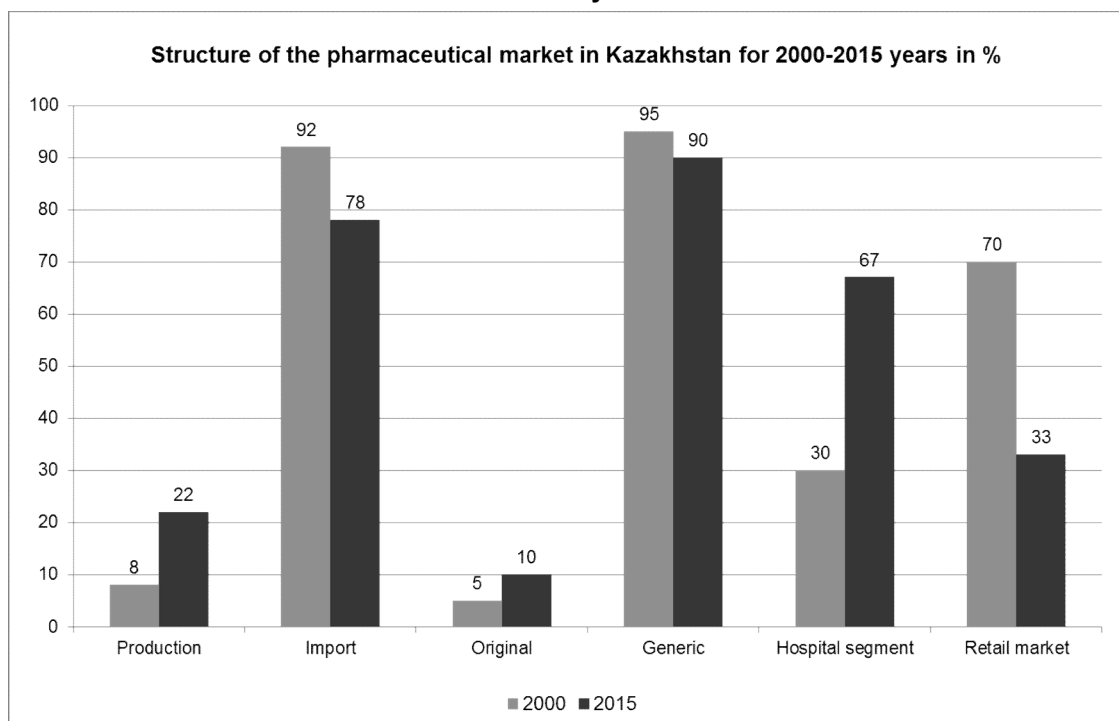
Research and development in the country and in Central and Eastern Europe as well (Report Hungary Pharmaceuticals&Healthcare).

The pharmaceutical companies spend €4.0 million on advertisements in medical journals in Hungary. The total amount spent by pharmaceutical companies on product advertisements in the 115 Hungarian printed medical journals came to almost 1.2 billion HUF (€4 million), Comfit, a media monitoring company, which specializes in medical journals, revealed it to Central Europe Pharma News. The same companies spend 478.7 million HUF (€1.6 million) on advertising the companies themselves (not their products). Richter Gedeon led the field in terms of advertising expenditure, with a figure of 90.4 million HUF (€303.000). In the second place there were Egis and Woerwag Pharma (Central Europe Pharma News Issue , 2013).

### ***3.3. The Expenditure on generic drugs and on Marketing of pharmaceutical products in Kazakhstan***

The pharmaceutical market of Kazakhstan was estimated at \$1.7 billion in 2015, the market is divided into retail pharmacy sales and government procurement. In Diagram 4 we can see the structure of the pharmaceutical market in Kazakhstan from 2000 to 2015 as imports remain between 78% and 92%. Out of these domestic production of pharmaceutical products occupies only 22%. The main parts of the product portfolios of domestic manufacturers are low-profit generic drugs (share in the total market volume is 90%) and the market of the original drugs is 10%, which allows pharmaceutical manufacturers to allocate their profits on Research and Development of new original drugs (See Diagram 4 and Table 5).

**Diagram 4.: Structure of the pharmaceutical market in Kazakhstan for 2000-2015 years in %**



Source: Consulting Agency "Vi-ORTIS"; Single Distributor, SK-Pharmacy

Diagram 4 and Table 5 show the structure of the pharmaceutical market in Kazakhstan for 2000-2015 years.

In 2015 retail pharmaceutical market occupied 33% of the total Kazakhstan market, hospital segment 67%. The retail segment is widely represented by well-known drugs. The rating of the most growing and large market includes vitamins, remedies for cold diseases, for the treatment of the gastrointestinal tract, as well as antibiotics and painkillers.

The hospital sector of procurement of medicines has been more oriented on purchase from domestic manufacturers of pharmaceutical products since 2010, thus the state supports domestic manufacturers of pharmaceutical products for the development of the pharmaceutical industry in Kazakhstan. For the period from 2010 to 2015 the share of pharmaceutical products purchased through the Single Distributor increased on average, 3 times from 35.8 to 107.5 billion KZ tenge (See Diagram 4 and Table 5) (Single Distributor, SK-Pharmacy).

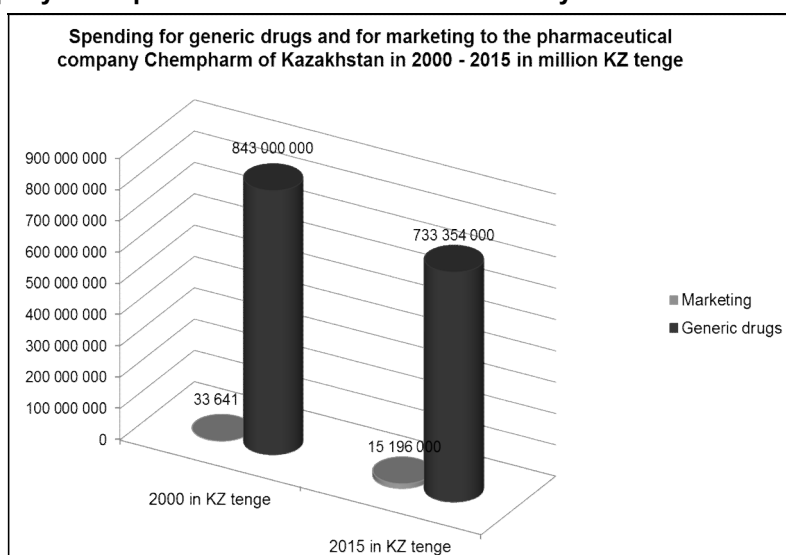
**Table 5.: Structure of the pharmaceutical market in Kazakhstan for 2000-2015 years in %**

Kazakhstan	2000 in %	2015 in %
Production	8	22
Import	92	78
Original	5	10
Generic	95	90
Hospital segment	30	44
Retail market	70	56

Source: Consulting Agency "Vi-ORTIS"; Single Distributor, SK-Pharmacy

The biggest Kazakhstan pharmaceutical company Chempharm specialized in generic drugs spends much less on marketing than on production of generic drugs. Graph 5 shows how the pharmaceutical company Chempharm spends a very small share of its income of 15.1 million KZ tenge on marketing. The production of generic drugs in 2015 produced 733.3 million KZ tenge, which means that even a large company produces generic drugs. However, in 2000 it produced more than 843 million tenge (See Diagram 5 and Table 6).

**Diagram 5.: The Expenditure on generic drugs and on marketing of the pharmaceutical company Chempharm of Kazakhstan in 2000-2015 years in million KZ tenge**



Source: Chempharm, Annual report, 2000-2015

Diagram 5 and Table 6 show the expenditure on generic drugs and on Marketing of the pharmaceutical company Chempharm of Kazakhstan in 2000-2015 years.

**Table 6.: The expenditure on generic drugs and on marketing of the pharmaceutical company Chempharm of Kazakhstan in 2000-2015 years in million KZ tenge**

<b>Chempharm company</b>	<b>2000 in million KZ tenge</b>	<b>2015 in million KZ tenge</b>
Generic drugs	843 000 000	733 354 000
Marketing	33 641	15 196 000

Source: Chempharm, Annual report, 2000-2015

Foreign pharmaceutical companies in Kazakhstan spend about 10-15% of annual turnover on marketing programs to introduce doctors their products, including sponsoring a conference and publication. In the over-the-counter segment where direct advertising of medicines for consumers is allowed, foreign manufacturers also managed to increase their market share. Foreign pharmaceuticals increased their market share thanks to advertising, despite the fact that domestic medicines were cheaper but they were not properly advertised. In Kazakhstan imported branded generics and innovative drugs are very popular among physicians and pharmacy staff often recommend patients who they cured.

### ***3.4. The regulation of advertising and promotion of pharmaceutical products in the United States, Europe, Hungary and Kazakhstan***

In Table 7 we consider how each country regulates the advertising of pharmaceutical products. In the United States marketing and distribution of pharmaceuticals is heavily regulated by the federal Prescription Drug Marketing Act. In general, pharmaceutical companies adhere to FDA regulatory guidelines that require all DTC ads and information to be accurate in order to provide substantive evidence of any statements that have been made, to strike a balance between the risks and benefits of the product being promoted and to maintain consistency with the labeling approved by the FDA (U.S. Food and Drug Administration, FDA). Europeans still have quite limited exposure to pharmaceutical advertisements for prescription drugs. The EU is of particular attraction to pharmaceutical companies, however, as it accounts for a full one-third of global drug sales. In Europe, the advertising is regulated by the International Federation of the Pharmaceutical Industry Manufacturers and Associations (Eagle L., 2002) (See Table 7).

Here are the details about the regulation of advertising and promotion of pharmaceutical products in Hungary and Kazakhstan. In Hungary the sales promotion sent to doctors and advertisements in publications shall be regulated by law. Professional/scientific audit and punishment for false and biased promotional materials the National Institute of pharmacy and Nutrition (OGYEI) has the liability (Lengyel G., 2007).

Advertising in Kazakhstan drugs shall be conducted in accordance with the order of the Ministry of health of the Republic of Kazakhstan. In Kazakhstan advertising of drugs is regulated by the Law of the Republic of Kazakhstan «On Advertising» and National center for expertise of drugs (National center for expertise of drugs, Dari.kz) (See Table 7).

**Table 7.: The regulation of advertising and promotion of pharmaceutical products in the United States, Europe, Hungary and Kazakhstan**

Countries	Regulation	Laws
United States	In the United States marketing and distribution of pharmaceuticals is heavily regulated by the federal Prescription Drug Marketing Act. In general pharmaceutical companies adhere to FDA regulatory guidelines which call for all DTC advertising and information to be accurate, to provide substantial evidence for any claims that are made, to provide a balance between the risks and benefits of the promoted drug, and to maintain consistency with labeling approved by the FDA (U.S. Food and Drug Administration, FDA).	U.S. Food and Drug Administration
Europe	Europeans still have quite limited exposure to pharmaceutical advertisements for prescription drugs. The EU is of particular attraction to pharmaceutical companies, however, as it accounts for a full one-third of global drug sales (Eagle L., 2002).	International Federation of Pharmaceutical Manufacturers and Associations (IFPMA).
Hungary	In Hungary the sales promotion sent to doctors and advertisements in publications shall be regulated by law. Professional/scientific audit and punishment for false and biased promotional materials, the National Institute of pharmacy and Nutrition (OGYEI) has the liability. Other non-scientific part of the promotion is governed by the advertising law and the Code of ethics of the pharmaceutical industry of all pharmaceutical companies in Hungary (Lengyel G, 2007).	National Institute of pharmacy and Nutrition (OGYEI).
Kazakhstan	Advertising in Kazakhstan drugs shall be conducted in accordance with the order of the Ministry of health of the Republic of Kazakhstan. In Kazakhstan advertising of drugs is regulated by the Law of the Republic of Kazakhstan «On Advertising» and also National center for expertise of drugs (National center for expertise of drugs, Dari.kz).	Law of the Republic of Kazakhstan «On Advertising» and also National center for expertise of drugs.

Table 7 shows the regulation of advertising and promotion of pharmaceutical products in the United States, Europe, Hungary and Kazakhstan.

## 4. Conclusion

The article analyses the expenditure on Research and Development by the industry sectors for the period 2005-2015. We have considered the costs of ten leading companies in the world focusing on Research and Development for 10 years. In this article we have studied the expenditure on Research and Development and on Marketing, sales of global pharmaceutical companies for the period 2000-2015. The top 5 global pharmaceutical companies spend more on marketing and sales than on R&D, and since 2000 the gap has been permanently increasing. The R&D expenditure used to be above 40 % and in 2015 it was less than 30 % in three from five cases.

We have estimated the expenditure of a Hungarian company, this is Richter Gedeon, which is still an independent Hungarian company and still has original medicines where the patent belongs to them and also the Kazakhstan company Chempharm, which focuses on the production of generic drugs. It is also a bias in terms of comparison, but we could not find a pharmaceutical company in Kazakhstan that has its own original drugs for sale. In addition to market statistics, we have considered the differences in regulation between countries with special attention to Hungary and Kazakhstan.

This trend exists in Hungary and in Kazakhstan as well. The Hungarian companies promote their products in journals and through radio and television heavily.

We compared the regulation of advertising and promotion of pharmaceutical products in the United States, Europe, and in Hungary and Kazakhstan.

We recommend the Governments and the International institutions to implement means which drive the pharmaceutical companies back to research. The governments should set limits for the advertisement in this field. They have to promote the open and the crowdsourcing innovations to make this kind of public good affordable for the poor as well.

## References

### *a) Articles in journals*

- Austin D, H. (2006). editor Research and development in the pharmaceutical industry 2006.
- Acosta A, C. A.-D. (2014). Pharmaceutical policies: effects of reference pricing, other pricing, and purchasing policies. *The Cochrane database of systematic reviews*(10), 59-79.
- Drummond M, (1992). Science or marketing? *Pharmeconomics*, 1(1), 8-13.
- Eagle L., K. P. (2002). Direct consumer promotion of prescription drugs: A review of the literature and the New Zealand experience. *International Journal of Medical*, 2(4), 293.
- Evans R, G. (1995). Manufacturing consensus, marketing truth: guidelines for economic evaluation. *Annals of Internal Medicine*, 1(123), 59-60.
- Llamas M, (2016). Big Pharma and Medical Device Manufacturers. Retrieved from Drugwatch: <https://www.drugwatch.com/wp>.
- Lakdawalla D, S. N. (2013). Pharmaceutical advertising and Medicare Part D. *Journal of health economics*. 6(32), 1356-67.
- Lengyel G, K. (2007, June). Pharmaceutical Pricing and Reimbursement Information.
- Lexchin, J. (2005). Foreign free riders and the high price of US medicines. *BMJ*, 958-960.
- Liu S, S. W. (2004). Integration of sales force with web-based technology– a case of pharmaceutical industry. *Journal of Business-to-Business Marketing*, 11(1/2), 131-48.
- Manchanda, P. (2005). Understanding Firm, Physician and Consumer Choice Behavior in the Pharmaceutical Industry. *Springer Science + Business Media*, 16(3/4), 293–308.
- Rod M., N. J. (2007). Pharmaceutical marketing return-on-investment: a European perspective. 1(2), 174-189.
- Rosenthal M, B. B. (2003). Demand effects of recent changes in prescription drug promotion. *Frontiers Health Policy Res*, 6(1), 1-26.
- Rubin P, H. (2003). The economics and impact of pharmaceutical promotion. 3(1), 6-19.
- Smith M, C. (2014). Principles of pharmaceutical marketing.
- Stremersch S., V. D. (2008). Marketing of the life sciences: A new framework and research agenda for a nascent field. Working paper, Erasmus University Rotterdam and Tilburg Un. *Plos Medicine*, 5(1), 29-33.
- Trott P. (2002). *Innovation Management and New Product Development*. Prentice Hall.

### *b) Internet*

- Consulting Agency "Vi-ORTIS". <http://www.viortis.kz/index.php/>
- Central Europe Pharma News Issue. (2013, March 20). *Market news*, 6(91).
- National center for expertise of drugs, Dari.kz. Dari.kz: [www.Dari.kz](http://www.Dari.kz).
- Strategy&pwc2015 Global Innovation 1000. (2005-2015). Retrieved from Strategy&2015 Global Innovation 1000: <https://www.strategyand.pwc.com/global/home>
- Single Distributor, SK-Pharmacy. <http://www.sk-pharmacy.kz/rus/>.
- Strategy & pwc, The Global Innovation 1000:Top 20 Research and Development Spenders 2005-2015. Retrieved from Strategy & pwc Global Innovation 1000: <https://www.strategyand.pwc.com/global/home>.
- U.S. Food and Drug Administration, FDA. Retrieved from U.S. Food and Drug Administration, FDA: <https://www.fda.gov/default.htm>.

*c) Reports*

Chempharm, Annual report. (2000-2015).

GlaxoSmithKline, Annual report. (2000).

GlaxoSmithKline, Annual report. (2015).

Novartis, Annual report. (2000).

Novartis, Annual report. (2015).

Pfizer, Annual report. (2000).

Pfizer, Annual report. (2015).

Richter, G, Annual Report. (2000-2015). Retrieved from <https://www.richter.hu/en-US>.

Roche, Annual report. (2000).

Roche, Annual report. (2015).

Report Hungary Pharmaceuticals&Healthcare. Retrieved from BMI Research, A Fitch Group company: <http://store.bmiresearch.com/>.

Sanofi, Annual report. (2000).

Sanofi, Annual report. (2015).